Forage growing offers multiple possibilities for income generation and job creation

Uwe Ohmstedt / November 2021

Summery

Different activities directly related to forage growing offer possibilities for income generation. Forage growing and feeding to the cows is significantly changing the dairy farms situation. It is improving the cows diet, the health status, the milk yield and such directly the profitability of the dairy farms. Feeding accounts for up to 70% of diary production costs which can be reduced by producing high value forage on farm. Forage growing for commercial purposes, being sold as fresh matter or as hay creates possibilities for farmers, even if the do not have the means or the willingness to go themselves into dairy production. Service provision as seedling producers or for silage making are other ways to profit from forage growing.

Problem statement

Feeding is a central element for livestock production. Only well-fed livestock is productive and is reaching out to it's potential. All over east Africa feeding is the bottleneck for higher productivity of livestock, so also for dairy cows. That applies for quantity as well as for quality of the available feed. Feed availability and quality is also very seasonal, depending on the rainfall patterns. Conservation of forage and stocking for scarcity periods is not widely practiced, which results also in scarcity of milk delivered to the processors.

Forage production and feeding is a way to mitigate the feeding challenges. It offers at the same time to make dairy production more economical. Forage production is increasing as more farmers are exposed to improved forages and realize their values. However, out of the 1.8 million dairy farmers in Kenya, the number of adopters is still poor. Delivering more information about the potential economic benefits of forage growing might boost the uptake of the improved forages.

The Tropical forages (group) of the Alliance Bioversity international and CIAT together with project partners of the 'Grass 2 Cash' project have developed 4 business models which are related directly to forage growing. We did not work on the multiple other occasions for income and job creation (e.g. seed trade, milk transport, increased and steady milk delivery to milk processors.

The 4 business models we developed

- Forage production and on-farm feeding of the produced forages
- Forage growing for commercial purpose, hay production
- Brachiaria Seedling nursery Business
- Artisanal silage making through 'service provider enterprises' in Kenya

show the potential of generating income and job creation based on forage production and are described in this document:

Forage production and on farm feeding of the produced forages

Proper feeding is identified as one of the most limiting factors in dairy production, several reports describe the feeding situation on many farms in Kenya as insufficient in quantity and quality resulting in underfed dairy cows, which such reach out only to a limited percentage of their production potential.

Cows require 50-60 kg of high quality of fresh feed/day to be healthy and productive. Most of the cows do not get this quantity, nor is the quality of the feed provided, meeting their nutritional requirements. Dried maize stokes, overaged Napier or low quality hay are frequent feeds and the productivity of the cows is consequently low. Production of forages can change the situation towards the better. Farmers planting forages and feeding them to their cows report on significant increased milk productivity.

Consultants of the Dutch Senior expert service recommend to feed dairy cows ideally on fresh high quality forage as this is ideal for the intake, digestibility and productivity of the cows.

On farm produced forage is also a way to bring down costs, which is important as feeding accounts for 60 – 70 % of the costs in dairy production. If the dairy farmer finds a way to bring down this cost factor, the production of milk will becomes more economic and the profitability of the farm will increase.

Conclusion:

- on farm forage production is increasing the quantity and quality of the available feed.
- feeding forages to the cows is increasing their milk production
- producing own forage brings down feeding costs

Production of forages and land size needed to feed one cow

If a dairy cow is exclusively fed on fresh forage:

Need of forage /cow / year: 50-60 kg / cow / day x 365 =18.250 – 21,900 kg /cow /year

Average 55 kg /cow/day x 365 = 20,075 kg /cow / year

Need of land:

Table 1: Example1; production data from Magut and Leketeton farms (Eldoret) for fresh forage

Forage (fresh)	Prod kg FM /ha/year	Prod/year: 20 t = numbers of cows fed /ha	Need of land to feed 1 cow exclusively on fresh forage
Brachiaria Mulato2	40 t	40t : 20 t/cow=2	0.5 ha
Brachiaria Cayman	51 t	51t : 20 t/cow=2,5	0.4 ha
Panicum Mombasa	50 t	50t : 20 t/cow=2,5	0.4 ha

If a dairy cow is exclusively fed on dry matter (hay)

Need of kg DM / cow / day: 12 -15 kg depending on the body weight of the cow

Need of kg DM / cow / year: Average 13.5 kg / cow / day x 365 = 4927 kg

Table 2: Example2; production data from Kagura ATC and Chure dairy from trials on cutting regime for dry matter. In brackets production range

Forage	Prod kg DM/ha/year (range)	Prod / year : 4,92t/year/cow= number of cows fed/ha	Need of land to feed 1 cow exclusively on
Brachiaria Basilisk	17.84 (15,24 – 20.46)	17,84 : 4,92 = 3.62	0.276 ha
Brachiaria Cayman	23.52 (18.62 – 28.42	23.52 : 4.92 = 4.78	0.209 ha
Panicum Mombasa	16.54 (10.61 – 22.46)	16.54 : 4.92 = 3.36	0.298 ha

Remark: Many farmers in the Meru area favour Panicum Mombassa and Panicum Tanzania due to the high biomass production. This is not reflected in the above productivity numbers and leaves some questions open and has to be further assessed.

Increase of productivity per cow after changement of feeding to a stronger forage based diet

Table 3: Four examples of increasement of milk production based on interviews with farmers in the Meru area. All the farmers interviewed have high potential exotic breeds, mainly Frisian and Holstein

Farmer	Cows total (milking cows)	Average prod of cows before	Average prod of cows after	Increase average per cow in l (%)	Increase in income / cow /year (KES)*	Total income from milk sales/year (KES)
Farmer 1	11 (4)	(8-9 l)	20 l (T: 80 l)	11 l (122 %)	3305 l / cow 114.070 (T: 456.000)	829.600
Farmer 2	29 (12)	18 l (total 212 l)	24 l (T: 300 l)	6 l (33 %)	1830 l / cow 62.220 (T: 746.640)	3.111.000
Farmer 3	5 (2)	15 l	18 l	3 l (20 %)	915 l / cow 31.110 (T: 62.220)	373.320
Farmer 4	15 (6)	13 l (T: 40 l – from 3 cows)	26 l (T: 160 l – from 6 cows)	13 l (100 %)	3965 l / cow 134.810 (T: 808.860)	1.659.200

*Lactation period: 305 days/year, price per l of milk 34 KES

Establishment cost for one ha of forages based on 20 farms from our Cost-Benefit Analysis (Virginia Mwangi, 2019) and info received from Climate smart Brachiaria Project.

Establishment cost for one ha of forages is about 110.000 KES. Based on experiences from South and Latin America forage plots can be harvested for at least 10 years without decrease of yield. Colleagues from CIAT's Tropical Forages have even seen forages plots used for more than 20 years without reestablishment.

Calculating a time of use of 10 years the cost per year are 11.000 KES/ha for establishment.

Yearly maintenance costs for the plots are calculated on a basis of 20 farmers interviewed for the cost benefit analysis. The average costs for maintenance / ha / year was calculated with 149.000 KES. This number is highly doubtable even that it is based on farmer interviews. Maintenance costs cannot be higher as the establishment costs; as costs for land preparation, seeds, planting and more intensive

weeding do only account in the first year, while manure application and harvesting costs are the main cost factors from year two on.

The origin forms show that e.g.

- Farmer 5 applied 36.000 kg wet manure on 2 acres, which translates to about 4.4 kg / m2, doubts are justified, if that is realistic. In addition, the value of 10 KES / kg of wet manure seems to be overestimated. A value of 3 KES / kg of dry manure seems to be the more realistic price (info from CIAT's long term trial responsible, 2019)
- Farmer 6 applied 360 kg of dry manure on ¼ acre, which translates to 0.360 kg / m2. The involved labour costs are 6 hours, which seems to be realistic, while 30 days each for harvesting 1000 m2 is not possible.
- Another farmer claimed having applied a quantity of manure, which would represent an amount of 40 kg of dry manure / m2, which is far from being realistic.
- There are more such examples, though we have to estimate the costs for maintenance; taking harvest costs and manure application as the main cost factors, the yearly maintenance cost can be estimated at maximum 50.000 KES/ ha / year. That gives a realistic cost of 61.000 KES / ha forage / year.

Table 4: Profit per cow / year calculated for four commercial oriented farmers in the Meru area based on the productivity data for forages from Table 1 and 2 and the increase in milk productivity by a stronger forage oriented feeding

Farmer	Forage necessary to feed 1 cow / year	Prod cost forage / year / cow	Additional income from higher milk production / year / cow	Profit per cow / year
Farmer 1	Br. Basilisk 0.34 ha	61,000 x 0.34 20,740 KES	114,000	93,260 KES
	Br. Cayman 0.30 ha	61,000 x 0.30 18,300 KES	114,000	95,700 KES
	Br. Mulato 2 0.5 ha	61,000 x 0.5 30,500 KES	114,000	84,000 KES
	P. Mombasa 0.30 ha	61,000 x 0.30 18,300 KES	114,000	95,700 KES

Farmer	Forage necessary to feed 1 cow / year	Prod cost forage / year / cow	Additional income from higher milk production / year / cow	Profit per cow / year
Farmer 2	Br. Basilisk 0.34 ha	20,740 KES	62,200	41,460 KES
	Br. Cayman 0.30 ha	18,300 KES	62,200	43,900 KES
	Br. Mulato 2			

	0.5 ha	30,500 KES	62,200	31,700 KES
	P. Mombasa 0.30 ha	18,300 KES	62,200	43,900 KES

Farmer	Forage necessary to feed 1 cow / year	Prod cost forage / year / cow	Additional income from higher milk production / year /cow	Profit per cow / year
Farmer 3	Br. Basilisk 0.34 ha	20,740 KES	31,100 KES	10,360 KES
	Br. Cayman 0.30 ha	18,300 KES	31,100 KES	12,800 KES
	Br. Mulato 2 0.50 ha	30,500 KES	31,100 KES	600 KES
	P. Mombasa 0.30 ha	18,300 KES	31,100 KES	12,800 KES

Farmer	Forage necessary to feed 1 cow / year	Prod costs forage / year / cow	Additional income from higher milk production / year / cow	Profit per cow / year
Farmer 4	Br. Basilisk 0.34 ha	20.740 KES	134,810 KES	114,070 KES
	Br. Cayman 0.30 ha	18.300 KES	134,810 KES	116,510 KES
	Br. Mulato 2 0.50 ha	30.500 KES	134,810 KES	104,310 KES
	P. Mombasa 0.30 ha	18.300 KES	143,810 KES	116,510 KES

This description of a business case is not claiming to be scientific; it is based on forage production measurement from four different sites in Meru and Eldoret undertaken over six respective 12 months. As productivity of forages depends on many factors like soil quality, natural rainfall patterns, altitude but also on forage management like fertilizer / manure application, cutting regime or additional irrigation, it is impossible to give exact predictions about harvests for a specific site.

The quantity of forage production is highly dependent on the environment and the management of the plots and the potential is high and profitable.

In the described business case, the forage is fed on farm to the dairy cows and increased in all cases the productivity of the dairy cows. It is known that the productivity of cows depends on many factors. Genetic potential, health, cow comfort are important, but the most important influence is given by the feeding. The above calculations are made under the estimation that all other influencing factors were kept stable and that the cows are entirely fed on forages. In reality the diet is composed of different origins (Napier, sweet potato vines, Rhodes grass hay, silage) but all interviewed farmers reported the

above noted productivity increases since the improved forages are more dominant in the feeding of their cows. It can be estimated that also local breads fed on forages will increase their productivity, but if it will be profitable will depend on the increase of the milk yield versus forage production costs, but all feeding is expensive and it would be interesting to compare other feeding costs to self-produced forage.

Conclusion: Even without referring to concrete numbers, all the farmers increased their profit per cow. The increase however differs, but the greater picture is that producing and feeding fresh forage to dairy cows has in general a positive effect and can be recommended to farmers.

Forage growing for commercial purpose, hay production

Forage production for commercial use is a model for people who are not able or do not want to invest in dairy production, but are looking for a crop which is relatively easy to cultivate and for which a market already exists.

It is also a possibility to start on a small area with small investments to gather experience and gradually expand once the grower is more confident with the production and marketing the product. In Western Kenya, forages are often sold fresh due to the bad reputation of hay, but Brachiaria can be dried well and transformed to high quality hay, making it a storable product that can be sold in times of higher demand and prices, like the dry season.

Case 1

In Western Kenya, young people have started small-scale productions using different Brachiaria (Hybrids and cvs) for commercial hay production. Info on these groups and data is taken from a report commissioned by GfA for the Green Innovation Center (Fodder value chain analysis in Western Kenya: Opportunities for Business development, David Miano Mwangi and Eunice Onyango, 2019)

Table 1: Cost of Production of Bracharia Hay in Western Kenya (Establishment Phase)

Activity/Item	Unit Cost (KES)	Units	Total Cost
1st Ploughing	3,000	1	3,000
2nd Ploughing	3,000	1	3,000
Harrowing	2,500	1	2,500
Seedlings	3	32,000	96,000
DAP (2 x 50 kg bags)	3,500	2	7,000
Planting	300	12	3,600
Weeding	300	12	3,600
Harvesting and baling (Per bale)	70	740	51,800
Labour for transporting to store (Man days)	20	300	6,000
Total			176,500

Table 2: Cost of Production for Brachiaria Hay Production in Western Kenya (Maintenance Phase)

Activity	Unit Cost (KES)	Units	Total Cost
Top dressing (1.5*50 kg bag CAN)	2,200	2	3,300
Labour for applying CAN (Man days)	4	300	1,200
Labour transporting	20	300	6,000
Harvesting	70	740	51,800

Total Cost (KES)	62,300

Mwangi / Onyango use a production of 10.000 kg DM/year that translates to 666 hay bales of 15 kg. The price of Brachiaria hay is given with 400 KES/Bale.

Using this production figure a turnover of 266,400 can be realized.

All the data given for case 1 are calculated per acre, to compare it to other case which are calculated per ha the numbers have to be multiplied by 2,5 which presents

Table 1.1. Cost of establishment of Brachiaria in Western Kenya/ha if bought seedlings are used

Activity/Item	Unit Cost (KES)	Units	Total Cost
1st Ploughing	7,500	1	7,500
2nd Ploughing	7,500	1	7,500
Harrowing	6,250	1	6,250
Seedling cost	3	32,000	96,000
DAP (5 x 50 kg bags)	3,500	5	17,500
Planting	300	36	10,800
Weeding	300	36	10,800
Total		156,350	

Establishment costs for Brachiaria plots used over 10 years 15,635 KES/year

Yearly maintenance cost (fertilisation, harvest, transport) 155,750 KES/year

Yearly cost per ha Brachiaria 171,385 KES/year

Table 1.2. Cost of establishment of Brachiaria in Western Kenya /ha if seeds are used

Activity / Item	Unit Cost (KES)	Units	Total cost
1st ploughing	7500	1	7,500
2nd ploughing	7500	1	7,500
Harrowing	6250	1	6,250
Seed costs	5000	8	40,000
DAP (5 x 50 kg)	3500	5	17,500
Seeding	300	12	3,600
Weeding	300	36	10,800
Total			100,350

Establishment costs for Brachiaria plots used over 10 years 10,350 KES/year

Yearly maintenance cost (fertilisation, harvest, transport) 155,750 KES/year

Yearly cost per ha Brachiaria 166,100 KES/year

Establishment costs for Brachiaria plots are about 1/6 of the maintenance costs, it is also a negligible difference between direct establishment by seeds or establishment by seedlings, as establishment costs have to be seen as a cost factor for 10 years. However, the initial investment differs and with seedlings, it is 50% higher.

Table 3: Cost benefit calculation for different Brachiaria from year 2 on (planted with seedlings)

Brachiaria	Prod cost per ha /year	Prod in t DM / ha / year	Value of prod / ha / year (KES)	Income – Prod cost = Profit (KES)
Not specified by Mwangi/Onyango	171,385 KES	25.00 *	400,000	228,615
Mulato 2	171,385 KES	8.00 **	213,000	41,615
Cayman	171,385 KES	23.52 ***	627,200	455,815
Cayman	171,385 KES	10.20 ****	272,000	100,615
Basilisk	171,385 KES	17.84 *****	475,730	304,345

production life of 10 years is base for the calculation (source: CIAT Tropical Forages)

*production data from literature, most possible they are too optimistic, especially when compared to measured production (see below)

**production data from 2 farms in Eldoret

***production data from cutting regime trials on 2 sites in Meru

****production data from 2 farms in Eldoret

*****production data from cutting regime trials on 2 sites in Meru

Value calculated on the base of 15 kg hay bales valued at 400 KES/bale (Mwangi, Onyango, 2019)

This business case is entirely taken out of the Study report: Fodder value chain analysis in Western Kenya: Opportunities for business development (David Miano Mwangi, PhD and Eunice Onyango, 2019) commissioned by GfA for the Green Innovation Center.

This report was included to give a wider picture on the different business opportunities around forage production.

Bracharia Seedling Nursery Business

Bracharia seeds can be directly sowed in well prepared seed bed however, a better stand can be established if the seeds are first planted in a nursery. Nursery establishment has several advantages over direct drilling of seed in the field:

1. Less seed is used:

Grasses including Bracharia are small seeded and not easy to handle. Therefore, when they are directly drilled the amount of seed used is high. The recommended seed rate is 3 kg per acre. The seed is drilled in shallow rows 50 cm apart. After germination the stand is thinned to give a spacing of 25 cm between plants. This gives a stand with approximately 32,000 plants per acre. When the

seed is planted in a nursery 1kg of seed can produce 32,000 seedlings. This would save the farm approximately KES 10,000.

2. Timing

Timing is important and will survival is improved. The stand is better and hence better forage yield.

A number of youth in Bungoma and Siaya are already selling seedlings to farmers who need to establish bracharia pastures. The nursery business was evaluated based on the available data from the youth in Siaya. The cost of producing 20,000 seedlings is KES 19,000 translating to about KES 0.95 per seedling (Table 13).

Table 13: Cost of Production of Bracharia Seedlings in Western Kenya

Activity/Item	Units Required	Unit Cost	Cost (KES)
Land preparation (Manday)	8	250	2,000.00
Planting labour	8	250	2,000.00
Irrigation (water and labour)	20	250	5,000.00
Seed (Kg)	1	5,000.00	5,000.00
Weeding (Mandays)	4	250	1,000.00
Manure (20 wheelbarrows)	20	200	4,000.00
Total Cost			19,000.00

A kilogramme of Mulato II seed will have approximately 40,000 seeds. At 85% germination rate a kilogramme of seed will produce about 34,000 seedlings. These seedlings are sold for between KES 3-5. Therefore, from 1kg of seed the produced seedlings will give a revenue of KES 102,000 – 170,000. The seedlings can be produced twice a year targeting the two rain seasons win western Kenya. The GM for the Bracharia seedling business is 90.7% (Table 14) and the first livelihood change from poor to emerging at 2.37 kg of seed where the per capita income would be KES 200. The income gets to lower and upper middle incomes at 3.4 kg and 5.94 kg of seed respectively.

Artisanal silage making through 'service provider enterprises' in Kenya

Introduction

Feed is key for the success of dairy farmers. The productivity of dairy cows in Kenya varies enormously between 1.5 l – 25 l per cow and day. There are different factors that influence the productivity of dairy cows, like the genetics (exotic breeds or cross breeds) or the quantity and quality of the fodder they get. A cow consumes about 50-60 KG of fresh fodder per day and the feeding costs represent about 75 % of the costs for dairy farmers, which shows that the provision of feed is a key factor in keeping dairy cows.

Research shows that the availability of feed depends a lot on the season. In the rainy season, there is normally sufficient animal feed available. Depending on the production scheme the animals are grazed on own or public land or held in sheds and fed there (cut and carry system).

While the dry season availability of fodder is dramatically different, especially for smallholder dairy farmers which own between 2-4 cows and work on an average farm size of up to 2 acre, scarcity of available fodder is frequent. Forage production and conservation is still an exception on most of the small-scale farms, though farmers depend on buying in fodder from commercial fodder and feed

producers. The prices for hay in the dry season go up to 220 KES/16-20 kg bale of Rhodes Grass Hay and up to 360 KES for better quality Lucerne Hay. Silage packs of 25 kg are sold at 250 KES.

The high prices for bought in fodder and feed often indicate a not sufficient feeding practice for the animals which 'just survive' and react with a productivity tending to '0'.

Apart of hay making, silage making is another possibility of conserving fodder for the time of scarcity. Silage making is labour intensive and has to be done properly. Different available plant material can be transformed into silage like maize, sorghum, Napier grass, Brachiaria grass, Panicum grass or residues from sweet potatoes or beans. As most of the farmers lack skills and labour force for silage production, there come in the service provider enterprises (SPE).

Service provider enterprises for silage making:

The idea of service delivery for silage making is already practiced in Kenya, namely by a group of 7 young man, based in Meru county (northeast of Mount Kenya)

The group, as more than 20 others, was trained by SNV's Kenya Market led Dairy Project in growing quality fodder, make silage, manage dairy feed and preserve animal feed.

Since then, they are offering their services to farmers in silage making (mainly maize silage).

The offered service consists in:

Preparation of the silage bunker and placement of a polyethylene sheet.

Chopping the raw material.

Bringing the material into the bunker in layers.

Adding a molasses-water mixture and compacting each layer before the next layer is added.

Once the silage pit / bunker is filled, the bunker is closed to prevent air contact of the silage material, which has to undergo a process of anaerobic fermentation.

Covering the silage material and cover it with a layer of soil for permanent pressure and to keep the air out to guarantee a proper fermentation.

Capacity of the 7 person group: up to 700 tons/month at the cost of 1KES /kg

Average income of the group members: 40000 KES/month

Needed investments:

Forage chopper (price range for self-propelled machines)	30.000 (light duty)-170.000(heavy d.) KES
Forage chopper (tractor driven)	600.000 – 2.000.000
Shovels, forks, wheel barrows (x6)	48.000
7 pairs of wellingtons	14.000
Other small material	10.000

(ev. training costs, if not coming from a dev. Partner)

Data that are more detailed have to be collected in field studies.

Silage making is mainly practiced at the end of the cropping seasons when the maize is ready for harvesting, though it is a seasonal occupation, which does not provide occupation and income over the whole year, but however offers occupation and income generation for parts of the year.

Expanding the silage making services to other types of silage like grass silage (Napier, Brachiaria and Panicum) could offer a more permanent demand for silage services, but up to now the production of forages is not so big that forages are mostly fed fresh or in some scarce cases farmers make hay out of Brachiaria.

This business case is actually practiced in the area east of Mount Kenya and from there down to Thika. CIAT is also in contact with a local company (development oriented) which is engaged in silage making and silage making training in Central Kenya. I am convinced that there is a lot of potential for silage making as one measure to mitigate effects of drought periods, which go along with fodder scarcity and a dramatic decrease of milk production. Especially in the areas with more rainfall and higher air moisture, silage making is a good alternative to hay making. Though the intensive agriculture areas of Western Kenya should be focused for scaling.

The above-described approach is economically interesting for medium scale farmers.

Based on the rainfall patterns and the variable fodder availabilities, farmers should be prepared to bridge different length of fodder scarcity periods. In the Western Highlands of Kenya, this period is about 2.5 months. Based on that estimation and knowing that a cow needs about 30 kg of silage per day to keep up a high productivity, it is easy to calculate the amount of silage, which a farm should produce, and store:

Need of silage fodder on the example of a farmer having 10 cows

30kg silage x 10 cows	need per day:	300 kg
300 kg/day x 30 days	need per month:	9000 kg
300 kg/day x 75 days	need for 2.5 months:	22500 kg

As the kg of maize silage is sold at 10 KES/kg that would represent costs of 225.000 KES (calculated based on the price of packed bricks). We found no information of prices for big quantities. To be verified, but for sure that will be cheaper!

For small-scale farmers the situation presents in a different way: small-scale farmers often only have 1-3 cows and neither the financement nor the space to store bigger quantities of silage. But also for them silage making is interesting to gap the fodder scarcity periods.

The possibilities are divers and

1) Silage can be prepared in pits of 2x2x1 m, which can take up to 1000 kg of chopped fresh material. The other material needed is about 20sqm of polyethylene sheet and 1-2 litres of Molasses. (This approach is recommended by ‘farmerstrend’ and can be done by the farmers or be part of a service package of the service providers.

One of these units will feed a cow for more than a month if the silage is the only fodder provided. For a period of 2.5 months, two of such described units should be sufficient.

2) Silage preparation in plastic bags/tubes etc.

The existing SPEs were trained by SNV and mainly established within Dairy cooperatives around Meru and Eldoret.

The SPE approach has got a potential for job creation in the rural areas and could be brought to other areas of Kenya, especially to areas which do not offer the best conditions for hay making

Target group	small scale and medium farmers as customers
	Youth groups which are trained for delivering the service
Product	silage making services
Costs	1 KES/ kg (costs for the customer)
Investment	1 week training in silage making for the group members
	(financement through donors or dairy cooperatives)
	Equipment for the service provider enterprise
	(could be prefinanced by Dairy cooperatives, loan schemes, rural banks)

Success factors

- Trained groups offer the service
- The services are of good quality and affordable for the customers
- Dairy farmers book the services and are satisfied with the service delivery
- Service delivery becomes part of the system